

Abstract Submitted
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Reduction of ion transport and turbulence via dilution with nitrogen and neon injection in C-Mod deuterium plasmas¹ M. PORKOLAB, P. ENNEVER, S.G. BAEK, A.J. CREELY, E.M. EDLUND, J. HUGHES, J.E. RICE, J.C. ROST, A.E. WHITE, MIT, M.L. REINKE, ORNL, G. STAEBLER, J. CANDY, GA, ALCATOR C-MOD TEAM — Recent experiments on C-Mod ohmic plasmas and gyrokinetic studies indicated that dilution of deuterium plasmas by injection of nitrogen decreased the ion diffusivity and may also alter the direction of intrinsic toroidal rotation [1]. Simulations with TGLF and GYRO showed that dilution of deuterium ions in low density (LOC) plasmas increased the critical ion temperature gradient, while in high density (SOC) plasmas it decreased the stiffness. The density fluctuation spectrum measured in low q95 plasmas with Phase Contrast Imaging (PCI), and corroborated with spatially localized reflectometer measurements show a reduction of turbulence near $r/a = 0.8$ with $k\rho_s \leq 1$, in agreement with modeling predictions in this region where the ion turbulence is well above marginal stability. Measurements also indicate that reversal of the toroidal rotation direction near the SOC-LOC transition may depend on ion collisionality rather than that of electrons. New experiments with neon seeding, which may be more relevant to ITER than with nitrogen seeding, show similar results. The impact of dilution on T_e turbulence as measured with CECE diagnostic will also be presented. [1] P. Ennever, et al., PoP 22, 072507 (2015).

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